Space Weather Forecast

Issued on Wednesday, 31 August 2022 at 12:13 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Slight chance of M-flares (R1-R2 Blackouts). Chance of G1/Minor Storm Day 4 (03 Sep).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity was Moderate, with a long period Moderate-class flare from a large region over the limb that was likely a much stronger flare on the far-side, with associated far-sided halo Coronal Mass Ejection (CME). There are two Earth-sided sunspot regions, with the most prominent a large but currently stable region that has recently traversed into the southwest quadrant. Despite the presence of a small magnetically complex area, overall this region is not showing signs of significant magnetic instability. A filament (line of plasma held above the surface of the Sun) eruption occurred around 30/1500 UTC, and produced a CME that may give a glancing blow at Earth.

Solar Wind / Geomagnetic Activity: Earth is likely moving through an elongated coronal hole fast wind, but we have also seen the tail end of a CME that gave a glancing impact to the Earth at 29/0245 UTC. Wind speeds showed a brief enhancement to 600-650km/s beginning around 30/1855 UTC, but otherwise speeds mainly around 550 km/s. The total Interplanetary Magnetic Field (IMF) strength was initially Moderate, but rose a little at 30/1855 UTC, before slowly easing to Weak. However the north-south component was mainly moderately positive, with brief periods of weakly negative. Geomagnetic activity was Quiet to Unsettled (Kp1-3).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is at background levels, with no solar radiation storms occurring.

Four-Day Space Weather Forecast Summary

Solar Activity: Activity is expected to fall to Low with any further flaring from the region over the limb increasingly unlikely to be observed. There is a slight chance, however, of isolated Moderate-class flares from the large region in south centre disc, with a very slight chance of Strong flares.

Solar Wind / Geomagnetic Activity: A filament eruption produced a CME which may give a glancing blow at Earth, most likely later on Day 4 (03 Sep). Solar winds are currently elevated to strong, with a gradual decline in wind speeds expected through the next couple of days. Following this we may see some weak influence from a coronal hole on Day 3 (02 Sep), followed by a further coronal hole fast wind. This feature may arrive either later on Day 4 but more likely on Day 5 (04 Sep).

Geomagnetic activity is forecast to be Quiet to Unsettled with a declining risk of Active intervals at first, easing to mostly Quiet from Day 2 (01 Sep). This may become Unsettled to Active with a chance of G1/Minor storm intervals on Days 3 or 4, with either the fast wind arrival(s) or from the filament eruption CME.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is likely to remain below the Minor Radiation Storm level (S1). There remains a slight chance of further increases to or above the S1 level, should any significant flares occur from the large region on the visible disc.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	1	10	30
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	20	20	20	20
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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